

Amendments to the Drawings

Replacement Sheets have been submitted for Figures 2-7 to overcome the drawing objection.

REMARKS

Claims 5-8, 10-14, 16, 18, 19, and 27-36 are pending. Claims 5-8, 10-13, 19, 29, and 30 have been amended, claims 1-4, 9, 15, 17, and 20-26 have been canceled, and new claims 31-36 have been added to recite additional features of the embodiments disclosed in the specification. Applicants have also re-submitted Replacement Sheets for Figures 2-7 to overcome the drawing objections in the Final Office Action. These Replacement Sheets have been resubmitted in view of non-entry of the § 1.116 Amendment.

I. The Rejection under 35 USC § 102(e)

In the Final Office Action, claim 5 was rejected for being anticipated by the O'Brien patent. The Examiner clarified the basis of this rejection in the Advisory Action issued on July 11, 2007.

Specifically, in the Advisory Action, the Examiner noted that Figure 1 of O'Brien shows a volume control circuit for only one of six channels. Accordingly, O'Brien uses a separate control 114 to adjust the volume for each of the six channels. Based on this reading, the Examiner concluded that O'Brien discloses a gain control means that independently controls the gains of the audio signals received by the pulse width modulators.

However, the manner in which O'Brien adjusts the volume of each of its channel signals is still different from many of the disclosed embodiments of the invention. To make these differences more evident, claim 5 has been amended to recite that the gain control unit "independently controls gains of at least a portion of the audio signals to be at different levels according to individual

channels.” (See, for example, Figure 13 for support). The O’Brien patent does not disclose these features.

That is, taking the Examiner’s interpretation into consideration, O’Brien discloses that volume control circuits 114 adjust the volume of six channel signals. The volume control circuits perform this function based on signals from an external control, e.g., a microprocessor-controlled circuit or push-button switches. (See column 2, lines 12-15). The O’Brien patent, however, does not disclose or suggest that volume control circuits 114 independently control gains of at least a portion of its channel signals “to be at different levels according to individual channels” as recited in amended claim 5.

Without such a disclosure, the O’Brien patent is like the related art circuits discussed in Applicants’ specification, which apply the same gain to all channel signals. Applicants’ invention as defined in claim 5 represents a significant improvement over such systems both in terms of reduced noise and improved efficiency and control.

Because the O’Brien patent does not disclose all the features of claim 5, it is respectfully submitted that O’Brien does not anticipate this claim. Withdrawal of the § 102 rejection is therefore respectfully requested.

II. The Rejection under 35 USC § 103(a)

Claims 13 and 14 were rejected for being obvious in view of a Kondo-O’Brien combination. Applicants request withdrawal of this rejection for the following reasons.

Claim 13 recites a plurality of gain controllers that each receive one of the audio signals received for a corresponding one of the plurality of pulse width modulators. In addition to these features, claim 13 recites that “the gain controllers independently control gains of at least a portion of the received audio signals to be different levels according to individual channels.” Claim 13, therefore, recite features similar to those which patentably distinguish claim 5 from the O’Brien patent.

As for Kondo, this patent was cited for its disclosure a reader, tuner, decoder, and at least one speaker. Kondo does not teach or suggest the function of the gain controllers of claim 13. Accordingly, it is submitted that claim 13 and its dependent claims are allowable over a Kondo-O’Brien combination.

Claims 16, 18, 19, 27, and 29 were rejected for being obvious in view of a Kondo-O’Brien-Beard combination.

Claim 16 ultimately depends from claim 13. In order to render claim 16 obvious, the Beard patent must therefore teach or suggest the features of claim 13 missing from the Beard patent. The Beard patent discloses a control circuit 40 which disables operation of a pulse width modulator 24. However, Beard does not teach or suggest a plurality of gain controllers which independently control gains of at least a portion of the received audio signals to be different levels according to individual channels.

Moreover, Beard only discloses receiving an input signal along one channel, not multiple audio signals along a respective multiple number of channels. Accordingly, Beard does not

independently and individually control the gain of some of those channels to the exclusion of other channels as is the case with the claimed invention.

Moreover, claim 16 recites “a plurality of controllers that independently enable the plurality of pulse width modulators according to individual channels.” (These feature are shown, for example, in Figure 15 of Applicants’ drawings where channels 1 and 2 are enabled and channels 3-6 are disabled). Beard does not teach or suggest independently enabling a plurality of pulse width modulators on an individual channel-by-channel basis as required by claim 16. These features serve to further distinguish the invention of claim 16 from the cited combination.

Based on the foregoing differences, it is respectfully submitted that claim 16 is allowable.

Claim 18 recites “a plurality of controllers that independently turn on/off the plurality of pulse width modulators according to individual channels.” In view of the foregoing discussion, It is clear that these features are not taught or suggested by the Kondo, O’Brien, and Beard patents, whether taken alone or in combination.

Claim 19 recites (1) a plurality of gain controllers which independently control gains of at least a portion of the received audio signals to be different according to individual channels of the pulse width modulators and (2) a plurality of controllers for independently turning on/off the plurality of pulse width modulators according to said individual channels, while audio signals are being received at said PWM apparatus. As indicated above, these features are not taught or suggested by the recited references, whether taken alone or in combination.

Claim 27 recites “a plurality of signal controllers coupled to the plurality of modulators to independently control at least one of input signals and output signals of the plurality of pulse width modulators, wherein the plurality of signal controllers comprise a plurality of controllers that independently enable the plurality of pulse width modulators according to individual channels.” These features are not taught or suggested by the recited references, whether taken alone or in combination.

Claim 29 recites that “the gain controllers independently control gains of the received audio signals according to individual channels.” These features are not taught or suggested by the cited references, whether taken alone or in combination.

New claims 31-36 have been added to the application.

Claim 31 recites that the gain control unit includes a plurality of gain controllers, each independently controlling a gain of audio signals received at a respective one of the pulse width modulators. These features are not taught or suggested by the cited references, whether taken alone or in combination.

Claim 32 recites that “the gain control unit independently controls a first number of the audio signals to be at a first level and a second number of the audio signals to be at a second level.” These features are not taught or suggested by the cited references, whether taken alone or in combination.

Claim 33 recites that “the first number is greater than one and the second number is greater than one.” These features are not taught or suggested by the cited references, whether taken alone or in combination.

Claim 34 recites “a controller to selectively turn off one or more of the pulse width modulators when a predetermined condition is detected.” These features are not taught or suggested by the cited references, whether taken alone or in combination.

Claim 35 recites that “the predetermined condition is an overload condition.” These features are not taught or suggested by the cited references, whether taken alone or in combination.

Claim 36 recites that “a controller to independently control phases of the audio signals, wherein the second controller adjusts phases of at least a portion of the audio signals to be different.” These features are not taught or suggested by the cited references, whether taken alone or in combination.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Withdrawal of the rejections and objections in the Final Office Action and timely allowance of the application are respectfully requested.

To the extent necessary, a petition for an extension of time under 37 CFR § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
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